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ABSTRACT

A simulation experiment demonstrated that the perceptual sensitivity of Swedish and Danish students at upper secondary school level varies systematically concerning the basic conditions for "personal growth." An attempt is made to constrain this concept contextually, in such a way that it can be described behaviorally. It is made evident that Swedish students are certain that only a society founded on the principles of behavior modification can provide the conditions for their personal growth. In contrast, Danish students have demonstrated a higher degree of differential sensitivity to contextual variations. Consequently, for them, a society that is building on behavioristic principles accommodates significantly different conditions for personal growth compared to a society building on process principles. Moreover, all three prototypical societies are discerned to have significantly fewer favorable conditions for the development of Life Quality (LQ) compared to the conditions of the Danish society. However, with respect to its surface conditions, the latter is determined to be highly similar to the social texture of the prototypical society which is obeying the principles of the process paradigm. Contains 7 tables of data and 30 references. (Author/BT)

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An Ecological Approach to Perceptual Sensitivity of Swedish and Danish Students

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The Basic Conditions of Life
An Ecological Approach to Perceptual
Sensitivity of Swedish and Danish Students

Bernhard Bierschenk

1998 **No. 67**

Cognitive Science Research
Lund University
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Abstract

The present paper takes up the problem of civilian development in Sweden and Denmark and its relation to some prototypical societies. By means of a simulation experiment, it is demonstrated that the perceptual sensitivity of Swedish and Danish students at upper secondary school level varies systematically concerning the basic conditions for "personal growth". Further, an attempt is made to constrain this concept contextually, in such a way that it can be described behaviourally. It is made evident that Swedish students are certain that only a society, founded on the principles of behaviour modification can provide the conditions for their personal growth. In contrast, Danish students have demonstrated a higher degree of differential sensitivity to contextual variations. Consequently, for them, a society that is building on behaviouristic principles accommodates significantly different conditions for personal growth compared to a society that builds on the principles of structure. But the latter is also perceived to provide significantly different conditions compared to a society, building on process principles. Moreover, all three prototypical societies are discerned to have significantly less favourable conditions for the development of Life Quality (LQ) compared to the conditions of the Danish society. However, with respect to its surface conditions, the latter is determined to be highly similar to the social texture of the prototypical society, which is obeying the principles of the process paradigm.

Research addressing the basic conditions of life is of most fundamental societal concern. In the past the reciprocal relationship between the individual member of a society and his familiar surroundings has been investigated on the basis of implicit assumptions about the nature of a particular environment rather than on explicit formulated assumptions and formal models. However, Gibson (1979) proposed the provoking theory of ecological perception, which concerns the formal study of the variables of stimulation to be found in informative light. His reanalysis of these variables encouraged him to develop a research paradigm with far reaching implications for the study of "height" as the major condition for "depth" perception and a demonstration of survival competence in very young infants.

This phenomenon is of widespread interest and has attracted researchers from different fields. They all agree with the view that perceptual sensitivity to height is a natural clue for the awareness of a risky environment. In the experimental context of his ecological approach, Gibson is emphasising that "depth" is an environmental "offer" (i. e., an affordance), albeit a negative one, which must be detected. From a perceptual point of view, affordances are defined as "invariant combinations of properties at the ecological level". Gibson (1979, p. 17) writes: "The medium contains information about things that reflect light, vibrate or are volatile. By detecting this information, the animal guides and controls locomotion". With reference to this statement it can be said that it is important to find the informative components contained in a medium.

To understand the significance of his approach for the study of the controlling function of the environment at the level of society, it might be pronounced that informational components are the "non-holonomic" constraints, which are specifying physical as well as social events at the kinematic level. For a dynamical system as complex as a society, there are many possibilities at its kinetic level to choose and to define alternative trajectories for making a living, but the non-holonomic constraints of the kinematic level are guiding and controlling the development of a chosen path. Thus ecological and perceptual invariants have to be distinguished from information in the "indicational" sense (Kugler & Turvey, 1987, pp. 419-420).

Previous experimental studies (B. Bierschenk, 1997) have shown that a perceptual distinction can be made with reference to a number of marker variables, given in the result section, which constitute the kernels of two super-ordinate components. It follows that the environment has to be processed on the basis of these components instead of mutually exclusive indicators. The crucial problem however is how to establish perceptually invariant components and how to measure the pick-up of optical information as a result of visual stimulation. The proposed approach of simulating societies relates to the interaction between the mechanisms of perceptual information pick-up and the formation of response patterns.

The major objective of the presented analysis is to find out whether or not the perception of the environment and "the co-perception of one-self in the context of others" (Gibson, 1979, p. 135) in that environment provides a means for abstraction or extraction of ecological invariants. For example, Gallup has since the 1960's studied how an organism can achieve a distinction between it-self and its mirror image. With this purpose in mind, he used primates for finding out whether and to what degree self-recognition can be established as "successful mirror guided body inspection" (Thompson, 1997, p. 288), which Gallup conceives of as an index of self-awareness (Gallup, Jr., Boren, Gagliardi, & Wallman, 1976; Gallup, Jr., 1997; Povinelli, 1993).

As discussed in Snodgrass & Thompson (1997), the concept of "self" has been accepted the axiomatic basis of psychology. Generally, it is taken for granted that the

"self" provides a disposition or a means to the single individual to develop complex strategies that can serve in his preparation for making a living as a member of a civilisation. Strategies, based on the emergence of a sense of self, allow the individual member of a society to begin to experience how self-awareness emerges from intentionality or "self-agency" (Stern, 1985; Thompson, 1997, p. 287). It means that one learns to begin to reason about "him-self" as well as to pay attention to this process and to others' way of reasoning. The process is reciprocally defining the affordances of one's milieu, which forms the basis for the mental transformation of loco-motion into ego-motion. Moreover, the process of making similarity judgements implies the organism's ability to transform ego-motion into ego-orientation and to distinguish between one's mental states from the mental states of others. This kind of comprehension is forming the basis for transforming ego-orientation into cognitive motion and consequently the basic conditions for the development of Life Quality (LQ).

This reasoning has led to the development of the LQ-scale, consisting of two orthogonal behaving psychometric constructs. One is the construct of "Eigenvalue", which is measured by the factorised scale (FI). The other construct is "Visibility of Social Texture", which is measured by the other factorised scale (FII). Under normal conditions, the function of social texture is to give "surface" support. But it can be used to check for the supporting properties of a particular environment. Hence factor (FII) reflects the way in which achieved Eigenvalue is conserved through the social texture of a particular society. Both constructs have been shown to be of import in exposing the individual to differences in LQ and in the expression of his potential of appropriate adaptation to those differences.

In order to separate experimentally the effects of perceptual sensitivity and environment, it is sufficient to restrict the levels of discrimination to a generation of scores on (FI) and (FII). The instructions and markers of LQ have been replicated over the last 15 years (B. Bierschenk, 1997a). However, indicative of experience is the environment of the single individual that has influenced the evolution of certain patterns of judgement (B. Bierschenk, 1997b).

This means that certainty of what is conceived of as LQ can be related to the meaning of certain events. It follows that certainty gives expression to the fundamental ability of the individual to make a distinction. In part, this ability depends also on one's mental determinants, which implies that the scales may have a guiding and constraining effect on the participant's analysis of what kind of LQ is offered to him. However it has been shown that the effects of the scales can be neglected, because they account for only (2.7%) of the explainable variance in the data set studied by Bierschenk and Marker (1998).

Against this background, it can be stated that there are sufficient indications that mentality is something that is formed on the basis of highly flexible strategies that favour the development of and elaboration of one's self-conception. Thus the context of a certain society, the inferences about the mental states of its members, and the judgement of intentions constitute the foundation of one's comprehension of LQ. The question is whether and to what extent Sweden and Denmark provide different conditions for the development of LQ. If different conditions exist, it may be asked in what way they are influencing the perception of the social texture, i. e., the perception of societal surface properties.

Thus, the aim is to study the student's efficiency in planning and the achievement of perspective control over one's environment and existence in that environment. Hence, the goal of the present simulation experiment is to contrast the

perceived properties of a native society with the properties of simulated models of societies, which may be called prototypes. Basically, the process of forming a hypothesis about one's possibilities of attaining LQ in alternative prototypical environments is specified by the affordances of these societies. In projecting different model societies under different environmental (contextual) conditions, cognitively relevant information can be picked up.

Finally, it should be pointed out, that this kind of experimentation is an attempt to fasten the LQ-concept in a variety of contexts that must be controllable, if the concept is to be described behaviourally. The simulation allows a statement on the kind of context within which its generalisation is possible and allowed. Moreover, simulation makes evident the kind of context in which its discrimination occurs. In previous studies (B. Bierschenk, 1997b), it has been shown that the level of certainty at which direct perception operates precludes the possibility that individual ecological properties are recognised prior to the formation of LQ as "focal view point condition" (Sommerhoff, 1950). It follows that the perception of import in an event sequence of a certain society is dependent on its "affordances".

Method

To reiterate, staging a co-operative interaction with a particular prototype is based on the assumption that a person, partaking in the simulation, can co-perceive himself acting in the displayed environment. However, if miss-information is picked up from a particular sequence of events, misperception will be the expected outcome. Therefore, from the Gibsonian point of view, it is important to separate the ecological invariants from the perceptual invariants. This differentiation has been realised by means of a separation of the context of action from the action itself.

Staging the Simulation of Observer-Event Involvement

Perceptual sensitivity to an environmental layout is synthetic and of critical import whenever a situation offers many affordances. But only a few have to be perceived in order to act adequately in the given situation. When the individual participant is confronted with a novel problem of risky type, as configured in the prototypical societies, he must pick up the significant relational properties rather than act analytical and rule-bound by focusing on some environmental features. Risky situations emerge without notice and suddenly, but they are accurately perceived only in relation the one's own cognitive movements. It follows that the distance between the participant, as actively engaging agent and the appearing event is not measured in the conventional sense, but in relation to his cognitive abilities. This means that any participant must handle any critical situation synthetically, which supposes that personal concepts have to be structured in such a way that the participant can adapt properly to the situational meaning.

Recently, it has been shown that the perception of affordances can be influenced through learning of concepts and conceptual relations (I. Bierschenk, 1998 b). To perceive something within "reach" is always within reach of the acting agent. Thus knowing something is dependent on perceptual acuity, mental flexibility and conceptual strength of the participant rather than on a physical, symbolic or conceptual entity. Any kind of conduct is accessible only to the degree that it can be reflected through the eyes of the participant. What is accessible to him is fundamentally dependent on what kind of events comes into his view. This relates the agent as scale-factor to the built-in constraints of the simulation of different sets of conditions.

Different sets of conditions have been generated for the display of alternative sequences of events, which may be called episodes. With respect to the conceptual foundation of these episodes, their establishment has to differ, but the episodes should be as similar as possible, otherwise it would be difficult to produce knowable variations in the structures of affordance during simulation. An affordance structure will not cause behaviour, but detection of its informative components will guide and control the perceiver's style of conduct. During simulation, it is expected that the participant can partly locate himself ecologically, and partly produce alternative response patterns. It follows that he must be allowed to find his way of relating himself to particular sequences of events according to one or more desired expressions of experienced processes during the interaction.

Thus, the analysis of simulation concerns the single individual's co-operative interaction with various physical and social surroundings as well as the cognitive integration of these surroundings. In this context are activated sets of refined information processes, which have the task to afford a comparison of one's experiential background with the experience made in adapting oneself to a simulated environment. By means of one or the other prototype, simulation makes possible an ordered, coherent and consistent specification of reality as expressed by one's familiar surroundings. Thus, a person can achieve this integration through development of his configuration of concepts.

Personal concepts and development of their structural relationship has a key position for likening a prototypical society with one's native society. It implicates that the effect of an environmental affordance, real or simulated, can be prospected with a high degree of certainty. Striking similarity in the response patterns resulting from the demands of a simulated environment has been demonstrated with the "Visual-Cliff" experiment of Gibson and Walk (1960). Under the condition of correspondence of environmental with perceptual invariance, this experiment shows that it is possible to manifest response patterns that are the result of perceptual sensitivity to environmental constraints.

In contrast, to an approach, where the "subject" is normatively defined as the object of measurement, it may be restated that the ecological approach builds on the premise that the perceiver is intertwined with the perceived in an interactive relation. Moreover, to what extent the participant in a simulation can exert prospective control over his existence depends on his prospective approach to a given society. Central to this approach is his intentionality, which manifests itself in his effectiveness in transcending environmental circumstances. It follows that the kind of time-binding behaviour a participant is able to generate is dependent on the ecological conditions. Their physical and informational characteristics are perceived to the degree that they have conceptual significance.

Thus, the physical links to the perceptual invariants are the specificational properties, which are guiding and constraining the participant's perception of the invariants embedded in the conceptualisation of a particular prototype. This means that perception always is process-oriented. This circumstance makes information flowing toward the perceiver. This assertion is made with reference to the "Gibsonian information law". Although a flow necessarily comprises an orientation of action, at the moment information is picked up it becomes perspectivated, because a flow is always produced intentionally.

It follows that the participant's formation of a fitting response pattern is an expression of his intentions. Further, as perceptual outcome, it is establishing personal effectiveness, i. e., an "agency" with respect to the degree of certainty concerning the

significance of perceived invariants. This means that informational invariants manifest themselves in the unique physical context that is provided by the observer-event involvement. For simulating this kind of involvement, the prototypes of the slide production "Projections for the Future" have been used.

According to the guide to this production (Lee & Mayer, 1976), the slides have been designed to introduce the viewer to contemporary concerns, which have both "scientific" and "societal" dimensions. Consequently, basic concepts of science such as (B) "Behaviour Modification", (2) "Structure", and (3) "Process" form the foundation for the slide production. Hence, the test material is aimed at attracting the attention of the viewer to fundamental macro conditions of survival.

Patterning of experience in the form of response patterns is of major import for the interpretation of possible experimental effects. Therefore, the single participant has been required to make informed judgements, which is presupposing sensitivity in selective attention and model orientation. Manifested in the model societies are reflected relations in simplified form, which is indicative of relations of greater complexity. Though there is nothing deterministic in the perceptual process that would require some choice between the models. In the process of transformation, the model societies have been serving as key in understanding perceptual and behavioural processes as well as the establishment of mental invariants (B. Bierschenk, 1987, 1988, 1989, 1992, 1997, 1998a, 1998b; Bierschenk, Helmersson, & Lohmander, 1987; Bierschenk, & Marker, 1998; I. Bierschenk, 1997, 1998a, 1998b).

Concerning their conceptual significance, Elstrup-Rasmussen (1998) has been able to show that the dialogue of the episode, which is modelling modern life and citizenship on the basis of the "Behaviour" model (B), is a precise reflection of instrumental conditioning. On the other hand, the "Humanist" model (H) of the production is a model of evolution and reflects central concepts of the theories of Gestalt formation, such as pregnancy and common fate. Finally, the "Growth" (G) model of the production is a model of steering and control and a good example of the impact of single valued dimensions on development and digression.

Participants. All students of the Swedish studies of concern came from one and the same upper secondary school of the university town of Lund, Southern Sweden. The first was conducted in February 1997 with four classes, (n = 101) students in their third year of study. The second study was carried out in May 1997. This study was replicated with the four classes of the first one, but now with (n = 96) students. A detailed presentation of the students may be found in I. Bierschenk (1997, 1998b). The Danish students were distributed over five City Schools at the upper secondary level of the Capital of Denmark. During the period of study, beginning in September 1997 and ending in February 1998, data were collected from (n = 162) students. At the time of testing they also were in their third year of study. The Danish students were at the time of testing about 19 years old and thus of approximately the same age as their Swedish counterparts.

Materials. Three series of the production of Lee and Mayer (1976) are used in this study. These series have been produced commercially in 1976 by the Biological Science Curriculum Study at the Colorado College in co-operation with Crystal Productions of Seattle, WA. The series are differently coloured and represent extrapolations of trends and tendencies in the US society of the late 70's.

A person does not only act, but tries to make judgements and tries to understand his own actions in this process. Accordingly, in the choice of possible end-point description, several alternatives are at hand. One could choose between judgement of (1) probability, (2) necessity, or (3) certainty. Moreover, it is expected

that one's assessment of certainty will have an influential impact on one's thinking and decision making. Therefore, he may appear very confident of the basis of his concepts of reasoning, but may be quite uncertain about the actual state. This relativity in certainty differs qualitatively from objective probability estimates of the following items:

A. *I am able to travel both within the country and abroad as I please.*
B. *I can direct my development on my own premises.*
C. *My right to privacy is guaranteed.*
D. *I can participate freely in organised opposition to those in power.*
E. *I can deal with the various aspects of my overall situation without undergoing undue stress.*
F. *I have the possibility of adapting my life to major changes in society.*
G. *I can choose the job I wish.*
H. *I can do whatever I like, as long as I do not infringe upon the rights of others.*
I. *I can make an active contribution to the re-evaluation of accepted morality.*
J. *I can obtain the education best suited to me.*
K. *I encounter new technical solutions in my everyday life.*
L. *My position in society depends upon the educational system.*
M. *My health depends upon society's technological development.*
N. *I can realise all my material desires.*
O. *My status in the society depends upon my education.*

On the basis of the I-reference in the given statements, the experimental subjects are expected to judge the sequences of events in agreement with their own personal frames of reference and the following instructions:

INSTRUCTIONS
You will be shown a picture series on video presenting a vision of a modern society where current trends have been allowed to progress even further. It is intended to give you the opportunity of imagining yourself as part of this society. You are asked to try and picture yourself in this society in such a way that you can form a clear conception of basic conditions, which would influence your life, if you were to live there.

After the display, you will be asked to give an account of your situation within the society depicted. You are to evaluate a number of statements about life there. In your assessment you may want to keep in mind some events or characteristics you find worth of serious consideration. You can do this by indicating how true or untrue you think each statement is with regard to the society by giving it a grade from 0 to 9. If you think it is "very certain" you should give it a 9, whereas if you think it is "not at all certain", indicate this by giving the statement a grade of 0. The degree of truth in each statement can be expected to vary, so don't hesitate to use the entire scale from 0 to 9. Please complete your assessment fairly quickly. Try and keep up a good pace, but don't leave anything out. Avoid making unnecessary corrections.

Design and Procedure. The experimental design together with an extensive discussion of the procedures of testing may be found in B. Bierschenk (1997).

Results

Denmark might be similar in many details, but is definitely not identical with the Swedish environment in which the LQ-scale was developed. With reference to the sizeable (51.6%) group effect, demonstrated in the study of Bierschenk and Marker (1998), the present analysis takes its departure in this stunning effect of differences in sensitivity between Swedish and Danish students. With reference to Gibson (1979), it can be stated that the medium or milieu contains the kind of information that can produce profound differences in response patterns. Hence, in a particular society development of meaning is related to the judgement of consequences of one's behaviour. As factor of discrimination, the individual participant's experiential background as well as continuous transformations are associated with his cognitive development. Concerning the participants perceptual searching for information as indexed by the LQ-scale, the group effect implies that the milieu or atmosphere of the environment, real or simulated, is differently conceived. Therefore, both factors will be studied with respect to the new environmental application, namely with respect to the Danish environment.

Factor Analysis

The primary concern of this analysis is to compare the two factorised scales of the measurements. The standard of comparison is shown in Table 1. It consists of factor structures, based on varimax rotations and obtained in 1997 from the studies of Swedish students.

Table 1.

Principal Components of the LQ-scale

Variable	Swedish (1)		Swedish (2)		Danish	
Item	Factor I	Factor II	Factor I	Factor II	Factor I	Factor II
A	.72		.80		.78	
B	.82		.85		.84	
C	.83		.82		.79	
D	.78		.86		.80	
E	.55		.63		.49	
F	.69		.69		.65	
G	.69		.69		.74	
H	.80		.81		.75	
I	.72		.80		.76	
J	.77		.77		.74	
K		.75		.79		.62
L		Missing		.74		.79
M		.76		.59		.60
N		.59		.55		.45
O		New		New		.77

Note. A loading below ($4/\sqrt{n}$) is suppressed, because of its uncertainty in projection (B. Bierschenk, 1971).

A measure of similarity can be obtained on the basis of the root mean square (Harman, 1967, p. 209; Rummel, 1970, p. 461). Table 1 shows that the two orthogonal components (FI = 0.022) and (FII = 0.172) work parsimoniously in the explanation of the variables. Because the root mean square measure is imposing very stringent similarity requirements on the set, it can be concluded that the same factor structure has become manifest. Thus, in considering the derived factors (FI, FII), the configuration has to be conceived from the information processing point of view. This means that the organisation of these statements has to be comprehended with a focus on the information, flowing among the components.

The next step concerns the identification of a standard of comparison, which defines similarity between both factor structures in the statistical sense. This criterion is the proportionality constant ($1/\sqrt{m}$), where (m) refers to the restricting number of items in the factor. Thus, this measure is constant with respect to the individual factor but variable over factors, which permits the determination of factor equality. Hence, the process of measuring similarity in the obtained factor structures refers to the reproducibility of a structure that consists of the two orthogonal components: Eigenvalue (FI) and Visibility of Social Texture (FII).

The assessment of the LQ-scale now in use measures the regularity in the response patterns irrespective of model. The comparison of the LQ-scale is made with respect to the psychometrical properties of their principal components as defined in Table 1. This comparison shows that the factors with label (FI) are practically identical, but the measure of distance concerning factors with label (FII) also shows good reproduction, because this measure is well below the proportionality constant of this component. Hence, the most important result is the reproducibility of the factor structure.

General Linear Model Analysis

From the cognitive point of view, it has been assumed that the treatment of the participants in the present simulation study will continue to produce orthogonal model effects and that it will be possible to carry out a least square estimation with the GLM procedures of MINITAB (1996). Further, variability due to the order of presentation of the treatments to a particular group of students has been controlled. A strictly random order of the models and random assignment of a particular sequence of models have governed the data collection in a certain class. The class-factor of Table 2 refers to two Natural Science classes, one Social Science class, and one Aesthetics class.

Table 2.

Sweden: Test of Main and Interaction Terms for the LQ-scale

LQ	Terms	η^2	F	DF	P
FI	Model (M)	0.451	106.44	3, 388	0.000
	Class (C)	0.008	1.05	3, 388	0.372
	M*C	0.344	22.56	9, 388	0.000
FII	Model (M)	0.013	1.72	3, 388	0.161
	Class (C)	0.002	0.27	3, 388	0.844
	M*C	0.193	26.57	9, 388	0.009

Sweden: As shown in Table 2, the first hypothesis of negligible class effect implies absence of an order effect. Obviously, the class effect is minimal. Therefore, this hypothesis has been accepted. Variability due to the order of presentation of the treatments to a particular group of students has successfully been eliminated from the experimental error. This means that the same dispersion has become manifest for the population means of any of the participating classes. However, a significant interaction effect between class and model is present.

The effect size index (η^2) is a measure of the proportion of variance, which may be recognised as a generalised (r^2). Further, the root of (η^2) may be conceived of as a point-biserial correlation between treatments and resulting response patterns, while (F) is the resulting quotient of systematic variance when set in relation to the error variance in the data set. In addition, (DF) is indexing the degrees of freedom in the numerator and denominator respectively. Finally (P) gives the probability for a mistaken treatment effect. A sizeable interaction effect complicates the interpretation, because the hypothesis of orthogonal treatment effects is mistaken. The analysis indicates that (19% to 34%) of the explainable variance relates to interaction effects.

Denmark: With reference to Table 3, it can be stated that the requirement for the establishment of an orthogonal model effect has been satisfied only in the Danish study, because the interaction between the model- and school-factor accounts for a small proportion (3% to 4%).

Table 3.

Denmark: Test of Main and Interaction Terms for the LQ-scale

LQ	Terms	η^2	F	DF	P
FI	Model (M)	0.567	273.49	3, 627	0.000
	School (S)	0.015	3.13	4, 627	0.015
	M*S	0.041	2.24	12, 627	0.009
FII	Model (M)	0.308	92.95	3, 627	0.000
	School (S)	0.004	0.56	4, 627	0.696
	M*S	0.034	1.84	12, 627	0.034

Consequently, with reference to Table 3, it can be said that the tiny proportion of variance, associated with the school-factor, shows that the random assignment of randomised sequences of models has been effective in the control of possible differences due to participating schools. In passing to the Model-factor of Table 3, it can be stated that this factor explains all systematic variance contained in the data sets. Based on Wilks's lambda, the effect-size index (η^2) points toward successful discrimination concerning the constraints that govern the development of (FI) as well (FII).

Moreover, the over-all power of discrimination of the models in Table 3 refers simultaneously to several contexts, which must be recognised and accounted for, if one wants to escape from the temptation of mystification. Concerning the response patterns of the Danish students, the statistical analyses show considerable correlation with the informational invariants contained in the prototypical societies as well as in the Danish society. This is a clear indication that the components differentiate between treatment conditions. The Danish milieu or atmosphere is apprehended as a medium that contains affordances of import for development of LQ. This means that

its richness in ecological information can be made the foundation for the abstraction and extraction of perceptual invariants.

Therefore, it may be stated that considerable ego-motion may be encompassed in one's perception of familiar surroundings. It is only by reference to this function that apparent arbitrariness can be avoided in selecting one rather than another set of conditions as fundamental for the development of LQ. Its functional relation to the prototypical societies is shown in the Tables 4, 5, 6 and 7. This means clear perception of basic conditions for the development of LQ. Clear perception gives expression to the fundamental ability of the participants to relate them-selves in a distinguished way to a particular society.

Perspective control is addressing the study of experience and its need for integration through the process of perception and judgement. Therefore, it might be helpful to conceive this process within the framework of societal diversity. The approach taken is essentially concentrating on a sequence of event of projected societies that to various degrees promote "individuation" or personal growth and "selection" or competitiveness (Ghiselin, 1981). One important outcome of "individuation" concerns the basic conditions for one's development of Eigenvalue. The implication of the model effects is depicted by means of the significance criterion It shows that factor (FI) is of concern. Moreover, the confidence intervals of the Tables 4, 5, 6 and 7 indicate that the intervals effectively control the dynamics of the models.

Perceptual Sensitivity of Swedish Students

Development of Eigenvalue

In contrasting perceptual sensitivity to properties encountered in one's native context with the properties as perceived of projected societies, the superiority of a prototypic society of type (B) is demonstrable in Table 4. This type of society is conceived with certainty to provide for the development of Eigenvalue. In contrast, according to the Swedish students, it is uncertain to what extent the other model societies can provide the conditions for the development of Eigenvalue. All students are equally certain that the prototypical society of (B) is most appropriate for developing Eigenvalue.

Table 4.

Sweden: Fisher's Individual Error Rate for Pair-wise Comparison in Measured Eigenvalue

Interval	B	H	G
H	3.27<3.74<4.41		
G	1.87<2.45<3.01	–1.97<–1.39<–0.82	
S	2.99<3.57<4.14	–0.84<-0.27<0.30	0.55<1.12<1.70

Note. Intervals for (column level mean) - (row level mean); Individual error rate = 0.05, Critical value = 1.97.B: Behaviour Model, G: Growth Model, H: Humanist Model, S: Swedish Model.

Fundamental to this kind of view is the instrumental aspect of this society. Thus, upbringing and learning are in principle responses or reactions to conditions in the individual's environment. The established cause-effect chains of events concentrate on shaping by manipulating socially acceptable behaviour, where desired

behaviour is rewarded and undesirable behaviour prevented by blocking it from its appearance. By behaviour modification through shaping of various forms of behaviour, or its de-conditioning (contra-shaping), it is implied that behaviour can be regulated through reinforcement contingencies and reward. The function of differential reinforcement is selective. It is essentially unidirectional and imparts information, but provides incentive values, which means that the control of stimuli and the strengthening or maintenance of a response is linked up with norm systems, outside the individual's controlling influence.

What is attractive to all Swedish students seems to be an environmental embedding of manipulation into a care-giving system. With respect to development of Eigenvalue, a member of such a society is developmentally "successful", to the extent that he can secure needed "subsidiaries" by responding according to the expectations of the planners. Therefore, a care-giving system may be seen to serve the function of reinforcement and reward beyond physical care, for example, by providing a secure base for the operations of daily life. The system is taken as the "security blanket" (Lefrancois, 1983, p. 316), which has the quality of protecting the individual from severe distress in his conduct to given environmental circumstances (B. Bierschenk, 1992).

For example, a member of a society of prototype (B) is totally dependent on the Public sector, and consequently highly vulnerable to the consequences of lost support or mistreatment by the system. However, the most interesting question to emerge is whether the individual would pay the price of cumulative protective efforts to address cumulative risk processes. Under the given circumstances, protective factors can be manipulated in order to achieve Eigenvalue and to circumvent competition and anxiety associated with the necessity of achievement. Provision of information in the form of reinforcement and reward is made the foundation for immediate and clear perception of people and events. It follows that a significant cliff can be discerned by an ordering of the models in agreement with expressed degree of certainty:

Structure: $\{$(H,G,S) uncertain $\rightarrow$ (B) certain$\}$.

The emerging pattern is simple. It shows that the produced relations between type of model and type of response pattern favours model (B). From the overpowering effect of model B, it can be deduced far more than the simple assertion that a given response is appropriate or effective under the given environmental circumstances. For example, it conveys the degrees of freedom that the Swedish students have perceived concerning development of Eigenvalue. In the given situation all students are most certain that model (B) is specifying the best environmental conditions. In contrast, all students are most uncertain about the condition provided by their familiar surroundings as well as the models (H,G). It follows that specificational information, positive in the case of model (B) or negative as in the case of (H,G), is an efficient determinant as soon as information in the Gibsonian sense is abstracted from the "optic array". The array carries the affordances of the environments. The milieu or atmosphere of the Swedish society seems to contain negative affordances. Evidently, the Swedish students are very uncertain about their possibilities of developing Eigenvalue.

Visibility of Social Texture

The relationship concerning the social texture of the models points toward important influences from both personal interests and interests of study. Table 5 makes evident that visibility of "conserved progress", relates more to the class than to the model effect.

Table 5.

Sweden: Fisher's Individual Error Rate for Pair-wise Comparison in Measured Visibility of Social Texture

Interval	B	H	G
H	–0.20<0.30<0.78		
G	–0.12<0.38<0.86	–0.41<–0.08<0.56	
S	–0.01<0.49<0.97	–0.30<–0.19<0.68	–0.38<–0.11<0.60

Note. Intervals for (column level mean) - (row level mean); Individual error rate = 0.05, Critical value = 1.97.B: Behaviour Model, G: Growth Model, H: Humanist Model, S: Swedish Model.

Moreover, the substantial interaction effect, shown in Table 2 is indicating that the classes are varying in their relationship to the models. For this reason, it can be argued that the Social Texture of Sweden may be knowable to a higher degree than what has been possible to infer from a look at the main effects of Table 5.

Through a study of the model-class interactions (I. Bierschenk, 1998b) information about this kind of interaction is provided. The study contains a discussion of the difficulties the Swedish students have had to pick up the affordances pertaining to structure and to distinguish them from the affordances specifying a textured surface. Their perception of structure and their perception of surface phenomena reflect various degrees of uncertainty. That is to say, with differences in degree, the models have provided a means to perceive one's own situation in the real world. Some models have specified positive affordances for some classes, while other models have provides negative affordances for other classes. This kind of interaction effects have been studied in detail in I. Bierschenk (1998b), therefore, they will be by-passed in the present context.

It is especially serious that young Swedish students, who are in the process of becoming professionals, show considerable perceptual incoherence when asked to react spontaneously to a variety of contexts. Obviously, incoherence in their ability to distinguish between the invariants pertaining to the structure of the Swedish model (Table 4) as well as between those specifying its texture (Table 5) has been made evident. This incoherence in ability concerns as well the texture of the other models as shown in Table 5. With reference to Table 4, it implies that the logic of structure of the Swedish model remains obscure and consequently unknown. In relation to Table 5, it means absence of discrimination in the Swedish response pattern concerning the Visibility of Social Texture, which from the specificational point of view implies that Sweden remains sweeping with respect to its logic of form. Speaking in Gibson's terms the Swedish model has a negative affordance with respect to the development of Eigenvalue and is dubious with respect to its supportive social texture.

Perceptual Sensitivity of Danish Students

This section presents the study of the Danish students. In the first place, bridging the Sound had required a factor structure that is sufficiently stable in its patterns and invariant. Otherwise it would have been difficult to make the meaning of ecological information pick-up explicit and to allow for possible evaluation, replication and comparison. Of course, each factor structure in its own right is a contribution to a greater understanding of the present framework. From a cognitive point of view, the study in this section is searching for the self-awareness of Danish students and their judgement of prospected behavioural consequences in various environments.

Development of Eigenvalue

With respect to Table 6, it can be said that the basic conditions of perceiving the models are founded on a unique blend between "structure" and "process". Concerning the development of Eigenvalue, all models perform on their own individual merits and implicate constructive operations.

Table 6.

Denmark: Fisher's Individual Error Rate for Pair-wise Comparison in Measured Eigenvalue

Interval	B	H	G
H	–4.33<–3.94<–3.55		
G	–2.48<–2.08<–1.69	1.47<2.06<2.25	
DK	–6.50<–6.10<–5.71	–2.56<–2.06<–1.77	–4.42<–4.02<–3.63

Note. Intervals for (column level mean) - (row level mean); Individual error rate = 0.05, Critical value = 1.97. B: Behaviour Model, G: Growth Model, H: Humanist Model, DK: Danish Model.

Clearly, the response patterns related to model (B) are dependent on the density of its social texture. From a perceptual point of view, relatively high institutional density makes it to appear impenetrable concerning its structure as well as its segments. Greater transparency of structure and texture is coupled with model (G). The structural connection to this model seems to be carried by "mastery" motivation. A prototypical society of its kind requires active engagement with the environment and a feeling of efficient interaction. In particular, high achievement is embedded in a highly dangerous inner city neighbourhood, where sections of the population seek to survive in gangs. Thus, a segregated environment is influencing its perception. Through the links of a recursive function, perceptual sensitivity to norm breaking behaviour and worry of making a living may be seen as successful conceptualisations.

Furthermore, pressure to involve and to achieve is simultaneously rising the barriers to opportunities for those who might appear as burdened groups in that society. In a response to this prototypical society (G), its members might very well be judged to be intellectually efficient concerning academic tasks, or even on practical tasks, but there is a much smaller set of criteria across individuals, families, communities and even societies, that reflect proper developmental progress. Multiple uncertainties and multiple potentials are contributing to the development of event sequences.

It means that development of Eigenvalue is conceptualised at a more advanced level compared to model (B). Conceived of as a society with a structure that is realising itself on the basis of proficient adults, it is required that the Danish participants can perceive the flexibility of a segregated society. This kind of society is enabling its members at the growing edge of their mental abilities. Under normal conditions they have considerable power to elicit assistance from other members as well as from social institutions. Those people demand uniqueness in problem solution and an orientation toward information of high quality, i. e., information of high precision and reliability. Thus, the living conditions of a segregated society indicate conceptualised confidence in provided information and process control over systems dynamics. Just, performing in its environment requires effective operations.

Typically for a prototypical society of type (G) is that this kind of challenge is connected to certain degrees of risk-taking. Otherwise it would be difficult to demonstrate the presence of competition in model (G) and to identify those sections that are specific for this kind of society. Abruptly appearing events and their experience has been basic to the foundation of growth. Accordingly, the "event" is the significant unit in the simulation of a risky environment. As a consequence, the behaviour of a member of this society is looked upon as the result of an active attempt to cope with these events and to make use of the opportunities offered by the environment. Personal growth requires the capability to negotiated challenges, in order to meet the demands of the environment.

A structure may remain stable over long periods of time or it may change from moment to moment, but this depends on the perceived characteristics of the flowing information. Development of Eigenvalue is embedded in significant challenges to appropriate adaptation, which is also required in a prototypical society of type (H). If the goal of a society is to foster the development of Eigenvalue of its members, this kind of society provides an effective strategy, namely the strategy of tutoring and opening of opportunities for accommodation. Gaining in "individual identity" is conceived of as a task of import for being able to develop Eigenvalue. In other words, a salient attribute of this society is the achievement of control over one's behavioural constraints. This kind of strategy is also connected to the development of self-efficacy and the feeling of pleasure in mastery or completing a task. In the context of this prototypical society (H), a member of it begins to acquire increasing control over his attention and his concepts and conceptual relations in order to control egomotion, which is affecting conceived success.

Reworking and co-operative behaviour are conceived of as additional assets fundamental to society. Behaviour is seen as a function of influences of concrete facts and perception. Consequently, learning is less important compared to the process of maturing. However, behaviour need not be understood as physical activity only, instead it has been operationalised as a change of state. From the Gestalt psychological point of view, nothing in behaviour corresponds to directness. Central to the event sequence is therefore how mental as well as other psychological structures change under the influence of the integration of new information. So, the episode of this kind of society (H) is concentrating on structuring of a task and acquisition of knowledge in which psychological forces have a point of application and certain strength, but the direction in change is locally defined.

Visibility of Social Texture

Visibility of Social Texture concerns the conservation of Eigenvalue in Denmark. As shown in Table 7, the only comparable society, which is flexible enough

and supporting in its social texture, is reflected by means of a prototypical society of type (G). But also uncertainty, related to the prototypes (B and H), deserves some comments.

Table 7.

Denmark: Fisher's Individual Error Rate for Measured Visibility of Social Texture

Interval	B	H	G
H	0.24<0.70<–1.16		
G	–3.03<–2.57<–1.11	–3.73<–3.27<–2.81	
DK	–3.12<–2.64<–2.19	–3.82<–3.35<–2.89	–0.55<–0.08<0.37

Note. Intervals for (column level mean) - (row level mean), Individual error rate = 0.05, Critical value = 1.97. B: Behaviour Model, G: Growth Model, H: Humanist Model, DK: Danish Model.

The Danish participants have conceived "Gestalts" as an expression of formless and timeless invariants. This implicates sensitivity to critical periods in the development of Eigenvalue, but this development follows an internal timetable. These students have been successful in their distinction of structure as something that is different from generalised patterns. Therefore, relative uncertainty of the presence of a social texture is harmonious with the presented outcome.

Certainty in the perception of prototype (H) refers to the kind of variability and degree of maturity that is demarcating the formation of structure. However, the formation of structure says nothing about its conservation. From a perceptual point of view, uncertainty, related to the "texture" of model (H), appears shadow-like. On the other hand, a slightly higher degree of certainty in the perception of the "social texture" of model (B) seems to be the outcome of its "degree of density". As stated previously, the organisational complexity of prototype (B) appears in its segments. These are displayed close together and consequently are impenetrable. From a perceptual point of view, this society is made to appear as compact. Likewise, in comparison with model (H) it is also incapable to conserve developed Eigenvalue. Relatively high institutional density, indicating pressure, is a hindrance for the Danish students, which becomes even more pronounced through the temperature of the social climate in this society.

In considering society of type (G) as a system that is highly organised, recursive structuring and changes in activity form a flexible and fine-grained texture. Changes in the frequency of a certain activity may signal changes in certain functions or segments. Obviously, the results show that the Danish participants have been able to perceive the flexibility of a segregated society. It follows that a cliff can be apprehended concerning the perception of texture by ordering of the models in agreement with expressed degree of certainty:

Form of Organisation {(B,H) uncertain → (G,DK) certain}.

The interesting point is that form properties have been differentiated from the properties of structure in an asymmetric manner. The notion "structure" refers here to the Tables 4 and 6, which are addressing both process and the actual relationship of the components of a structure. On the other hand its form of organisation concerns Tables 6 and 7, which makes reference to organisational stability.

Discussion

In conclusion, as a result of the individual's adjustment to the different conditions of the model societies, their transformational content is changing, which has led to new and unexpected processes of transformation. It follows that the transformation of different events has had an interrelated effect, which has produced specific experiences during simulation. Certainty in judgement is directly related to the perception of these events. However, the effects of experience are different from the effects of learning in the classical sense. It is the effect of involvement that is generating the affordances and consequently the establishment of perceptual invariants.

The development of Eigenvalue and its conservation by means of an appropriate "Social Texture" requires an advanced civilisation. Therefore, societal development has been examined with respect to its form (degree of organisation) on one hand and its variability (degree of structure) on the other. Consequently, it has been the aim of the present study to reveal the participant's perceptual sensitivity to important properties of the environment. For that purpose, conceptually different societies have been simulated in order to find out how different environmental properties are mastered perceptually.

Active perceptual exploration means that the participant can detect ecological invariants and achieve properly adapted response patterns. But Swedish and Danish students differ systematically in their sensitivity to properties of structure as well as to properties of texture. Especially with respect to the perception of the Swedish students, it can be concluded that their style of conduct appears to make "social modelling" the major determinant for their development of Eigenvalue.

In contrast, Danish students are sensitive to the texture of the cybernetics model. These students see the greatest potential for conserving developed Eigenvalue in the texture dynamics of this model (G). It is likely that the perceived similarity between the models (G,DK) is resting on their similarity in degree of density. Obviously, organisational complexity varies, but texture can be made to appear alike. Therefore, their perceptual cliff concerning Visibility of Social Texture separates models (B,H), because they seem to have significantly less conservational power compared to the models (G,DK). From the perceptual point of view, relatively high institutional density and compactness as that of model (B) obscures its conservational power in the same way as the shadow-like appearance of model (H). Their response patterns to its texture shows that they have perceived the "Gestalts" of model (H) as spatial arrangements of complex components that are organising the perceptual flow-fields. What corresponds to the invariants of a societal surface or form of organisation, are with respect to its depth the invariants of structure. In its simplest sense it is a unique and reliable survival response to the affordance of a demanding environment.

Spontaneously, the Swedish students have picked up negative affordances from the prototypical societies (H,G) as well as from their familiar surroundings. For this reason, it can be stated that Sweden in the eyes of its students provides an unfavourable environment for the development of Eigenvalue. The positive affordances are confined to the specificational information, which has been picked up from the prototypical society that has developed a civilisation in Skinner's sense (Skinner, 1972). Moreover, these students are documenting their incapacity to differentiate between the surface-dimensions of the models on one hand and the Swedish model on the other.

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